
Repair of Cartilage Defects in Arthritic Tissue with Differentiated Human Embryonic Stem Cells.

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Public Summary:

Chondrocytes have been generated in vitro from a range of progenitor cell types and by a number of strategies. However, achieving reconstitution of actual physiologically relevant, appropriately-laminated cartilage in situ that would be applicable to conditions, such as arthritis and cartilage degeneration remains elusive. This lack of success is multifactorial and includes limited cell source, decreased proliferation rate of mature chondrocytes, lack of maintenance of phenotype, reduced matrix synthesis, and poor integration with host tissue. We report an efficient approach for deriving mesenchymal chondroprogenitor cells from human embryonic stem cells. These cells generated tissue containing cartilage-specific matrix proteins that integrated in situ in a partial-thickness defect in ex vivo articular cartilage harvested from human arthritic joints. Given that stem cells provide a virtually inexhaustible supply of starting material and that our technique is easily scalable, cartilaginous tissue primed and grafted in this manner could be suitable for clinical translation.

Scientific Abstract:

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